

**ARIZONA GAME AND FISH DEPARTMENT
HABITAT PARTNERSHIP PROGRAM
HABITAT ENHANCEMENT AND WILDLIFE MANAGEMENT PROPOSAL**

PROJECT INFORMATION	
Project Title: Bismarck Lake Aspen Restoration Project (located within the Hart Prairie Project area)	Project No. 10-212
Region/GMU: Region II, GMU 7E	HPC:
Project Type: Wildlife habitat improvement through broadcast burning, thinning, and "jackstrawing" of conifers	
Project Description: 200 acres of aspen near Bismarck Lake and within the Hart Prairie Project area will receive a broadcast burn to stimulate aspen regeneration. After burning, conifers will be thinned within the aspen. Approximately half of the area will be jackstrawed to protect aspen regeneration from ungulate browsing. Jackstrawing involves dropping whole trees in various directions and leaving them on the ground. Jackstrawing is being utilized in lieu of exclosure fencing so that wild ungulates may still access, utilize, and move through the area, while protecting islands of aspen regeneration from browse damage. Monitoring plots will be established prior to treatment and will be re-measured annually for 5 years post-treatment to evaluate treatment effectiveness.	
Wildlife Species to Benefit: Elk, mule deer, turkey, and a wide variety of birds and mammals that use aspen for foraging, nesting, breeding, and resting sites. ***This area is considered to be "excellent" elk habitat by AZGFD.	
Possible Funding Partners:	
Implementation Schedule: Beginning: Late Summer/Fall 2011 (weather permitting) Completed: Fall 2012	NEPA Compliance: (if applicable) Completed: <u>Yes X</u> No ____ Projected Completion Date:
PROJECT FUNDING	
SBG Funds Requested: \$48,000	
Cost Share Funds: \$50,200	
Total Project Costs: \$98,200	
PARTICIPANT INFORMATION	
Applicant: Patty Ringle, Silviculturist (please print) Coconino National Forest Telephone: 928-527-8285	Address: Peaks Ranger District 5075 N Hwy 89 Flagstaff, AZ 86001
AGFD Contact and Phone No. Carl Lutch 928-214-1242 (If applicant is not AGFD personnel)	
Coordinated with: AZGFD, Steve Clark and Jim deVos (AES), Ed Smith and Neil Chapman (Nature Conservancy)	Date: 6/30/10
Applicant's signature: Patty Ringle	Date: 8/31/10

WAS PROJECT PRESENTED TO THE LOCAL HPC? YES _____ NO X_____

A fieldtrip to aspen stands within the Hart Prairie Project area was conducted on June 30, 2010 with the Arizona Elk Society, Arizona Wildlife Federation, Coconino Sportsman, and AZGFD. Forest Service personnel also presented a powerpoint entitled "Aspen, Wildlife, and the Hart Prairie Project" to AES officers and BOD and to AZGFD personnel on November 2, 2009.

HAS PROJECT BEEN SUBMITTED IN PREVIOUS YEARS? No

NEED STATEMENT/PROBLEM ANALYSIS:

Within the greater Hart Prairie Project area, there is 3,740 acres of aspen, representing approximately 40% of the total aspen acreage on the Flagstaff Center. The Hart Prairie project proposes to restore a total of 3,215 acres of aspen (see Figure 1). Historically, these aspen stands were fairly healthy and mature, with overstories dominated by aspen. Conifers (ponderosa pine, southwestern white pine, and Douglas fir) either dominated the mid and understory layers or were not present. Over the past 50 years, aspen communities across the project area have been in a *gradual* state of decline due to a lack of disturbance resulting from fire suppression and browsing pressure from ungulates. However, over the past decade, aerial and ground detection surveys have determined an alarming rate of decline in aspen clones across the project area, with the majority of aspen sites sustaining greater than 60% aspen mortality (Fairweather et. al. 2008). Aerial detection survey data over this time period show most of the aspen cover type in the project area has been impacted (Figures 2 and 3). Ground surveys revealed aspen decline is due to a range of stressors including: a late season frost event in June of 1999; severe drought in 2002–2003; defoliation by western tent caterpillar in 2004, 2005 and 2007; and multiple secondary agents acting on stressed trees, including bark beetles, canker fungi, and borers. The residual aspen trees are, in general, of poor health with reduced crown canopies (see Figure 4).

The rapid mortality of aspen observed in the Hart Prairie project area occurred across other forests in Arizona over the same time period and resembles a decline disease (Manion1991). Decline diseases are defined as having three components, which are identified as predisposing, inciting, and contributing factors. A primary predisposing factor is the succession of aspen dominated forests to conifer species that occurred over the past 100 years and was addressed in Amendment 11 of the Coconino NF Forest Plan (USDA Forest Service 1996). Although succession to conifers is a natural event, it was the alteration of fire regimes and livestock grazing since European settlement that promoted a more consistent landscape level succession to conifers (USDA Forest Service 2009).

The death of mature aspen, by fire or other natural disturbance, is not in itself cause for alarm because of the natural ability of aspen roots to readily regenerate after death of the overstory trees. However, there is little evidence on the San Francisco Peaks of successful aspen recruitment due to ungulate browsing. Browse impacts on aspen within the project area were documented as early as the 1940s, when fences were constructed near Bismarck Lake to control the movement of sheep into an aspen regeneration research area (USDA Forest Service 2009). However, for the past several decades, severe aspen browse impacts are attributed to Rocky Mountain elk (USDA Forest Service 2009). In the 1980s and 1990s, elk browse impacts were so severe that several harvest and wildfire areas located within the Hart Prairie Project area failed to regenerate when new sprouts disappeared. Elk exclosure fences that are 6 to 7 feet tall were constructed around aspen regeneration for protection. Currently, successful aspen regeneration is restricted primarily to fenced exclosures, areas that had previously been fenced, or areas that contain steep slopes. The few trees that grew above the browse line are impacted by elk antler rubbing and stem barking, resulting in young trees with advanced stem decay that will eventually fail.

Chronic browsing is compounding the decline of aspen clones across the region by preventing successful regeneration of aspen and causing a shift in age-class distributions. Browsing, coupled with widespread mortality

of mature aspen and advanced conifer regeneration, is expected to result in an eventual type conversion from aspen to conifers or grassland at a landscape scale within the next 80-200 years (Strand et al. 2009). Loss of aspen clones at a landscape scale signifies a tremendous loss of biodiversity, with aspen decline cascading into losses of vertebrate species, vascular plants, and likely species from a myriad of other organismal groups (Strand et al 2009). Aspen communities are a critical element within the forests of northern Arizona, representing one of the most biologically diverse and ecologically unique sites and serve as an indicator of ecological integrity (Di Orio et al. 2005).

Aspen also provide unique and diverse wildlife habitat for a variety of wildlife species. Aspen forests provide important foraging, nesting, breeding, and resting sites for a wide variety of birds and mammals. DeByle (1985) listed 134 bird species and 55 mammals that use aspen habitats and aspen may be required habitat for species such as the red-naped sapsucker, warbling vireo, and MacGillivray's warbler (Reynolds and Finch 1988). Game and waterfowl species that use aspen include elk, mule deer, white-tailed deer, wild turkey, Abert squirrel, red squirrel, black bear, cottontail rabbit, and a variety of predatory and fur-bearing animals, as well as six species of ducks. Non-game species include five species of bats, eleven species of hawks, six owl species and an assortment of other songbirds and small rodents and mammals. Aspen stands also provide palatable forage for a wide variety of wildlife species. Although many animals use aspen year-round, this nutritious species may be especially valuable during the fall when protein levels of most available forage plants are low (Tew 1970). Aspen may serve as an important and palatable source of protein on winter ranges when other plants are scarce or unavailable (Patton and Jones 1977). Both mule deer and white-tailed deer feed on aspen during most of the year while elk will use aspen as browse primarily in winter, spring and autumn when grass and forbs are not as readily available. Additionally, the aspen forest type provides good hiding for large ungulates during much of the year, and at least some thermal cover throughout the winter months (Debyle 1985). Mid-elevation aspen and the associated vegetation provide critical cover and forage for cow elk and calves. Also, aspen provides a readily available food source for porcupines and rabbits. Small rodents such as squirrel, pocket gophers, mice, and voles feed on aspen during at least part of the year (DeByle 1985). Black bears eat aspen buds and catkins. The bark is digestible by ruminants, somewhat nutritious and is readily chewed from the tree. Turkeys, bats, woodpeckers and sapsuckers forage on insects, which are abundant in the aspen type. Thirty-four of the eighty-five cavity nesting bird species nest in the cavities of aspen in the West. Raptors and other canopy nesting birds will also nest in aspen stands. Several birds use the understory vegetation of aspen to build nests on the ground while others use the associated shrubs. It is important for avian conservation to maintain many aspen stands across the landscape encompassing a diversity of vegetation structure and composition. Research by Griffis and Beier (1993) suggests that aspen stands do not harbor separate populations, but rather are locations where the regional avifauna reaches high local density and richness and may be crucial to birds in years of resource scarcity.

PROJECT OBJECTIVES:

The *overall* objectives of the greater Hart Prairie Project are to:

- Improve wildlife habitat
- Increase forage quality and quantity
- Improve forest health, especially in the aspen cover type
- Reduce the risk of catastrophic, stand-replacing wildfire to private property and the San Francisco Peaks
- Reintroduce low severity surface fire to the ecosystem
- Create a sustainable forest structure that will persist over time and that is within the range of natural variability
- Improve watershed functioning
- Improve plant species diversity

The objective of the Bismarck Lake Aspen Restoration Project is to restore the health, vigor, and sustainability of 200 acres of aspen near Bismarck Lake, which is an area considered to be excellent elk habitat by the AZGFD. Ensuring the sustainability of aspen clones involves the protection of aspen regeneration and its survival to maturity.

PROJECT STRATEGIES:

The greater Hart Prairie Project will utilize a landscape-scale, ecosystem management approach to address multiple issues affecting the project area. A variety of strategies will be used to meet multiple objectives.

1. Aspen Restoration – 3,200 acres - Prescribed fire, ripping, planting, conifer removal, and fencing and/or jackstrawing felled conifers to stimulate aspen regeneration and protect regeneration from browsing.
2. Ponderosa pine and mixed conifer restoration – 4,000 acres – Thinning of dense conifer stands and burning to improve forest health and forest structure, reduce fire hazard, and improve forage quality and quantity.
3. Meadow Restoration – 1,500 acres – Removal of conifer encroachment and burning to stimulate growth and regeneration of herbaceous species, increase water yield and availability, and improve forage quantity and quality for elk, mule deer, and antelope.

Strategies involved in the Bismarck Lake Aspen Restoration Project include broadcast burning and thinning/jackstrawing of conifers to increase aspen regeneration and survival to maturity, which over time will improve wildlife habitat for a variety of wildlife species. After burning, conifers which have encroached into the area will be cut by hand using chainsaws. Conifers will be dropped in a “jackstraw” fashion to protect aspen seedlings from browsing damage. The jackstrawing will be arranged across 50% of the area in such a fashion that wild ungulates will still be able to move through and use the area, while islands of aspen regeneration are protected. The jackstraw method is being used as an alternative to exclosure fencing to protect young aspen while still allowing wild ungulates to access the area. This area has not been grazed by livestock for over 20 years.

Additional treatments funded by the Forest Service will begin in FY11 in the greater Hart Prairie Project area. An additional 120 acres of aspen will be treated by burning and thinning of conifers at an estimated cost of \$75,000. Approximately 2,000 acres of mixed conifer, ponderosa pine, aspen, and meadows will be laid out and prepped for a stewardship contract, which would be implemented in 2012-2015. Estimated funding for prep and lay out in FY 11 is \$250,000. Additionally, broadcast burning within the project area will begin this Fall, 2010.

PROJECT LOCATION:

The greater Hart Prairie Project area is located on the Peaks Ranger District of the Coconino National Forest approximately 15 miles northwest of Flagstaff, Arizona (see Figure 5). The project is located west of the San Francisco Peaks and the Kachina Peaks Wilderness area and north of the Nature Conservancy Hart Prairie Preserve.

The Bismarck Lake Aspen Restoration Project is located within the greater Hart Prairie Project area, between Bismarck Lake, Windmill Tank, and Lew Tank in T23N, R6E, Section 23.

LAND OWNERSHIP AT PROJECT SITE (Please state specifically if PRIVATE PROPERTY and provide landowner's name):

The greater Hart Prairie Project area consists of 12,776 acres, with 11,323 acres of National Forest land and 1,453 acres of private land (see Figure 1). Land ownership within the Bismarck Lake Aspen Restoration Project area is Coconino National Forest.

HABITAT DESCRIPTION:

Aspen with a significant component of conifer encroachment due to fire suppression. Average elevation is 8600 feet.

ITEMIZED USE OF FUNDS:

Activity	Cost per unit	Unit	Total Cost	SBG Funds	Cost Share Funds
Broadcast burning	\$200 per acre*	200 acres	= \$40,000	\$0	\$40,000
CREC crew – tree felling/jackstrawing	\$6000 per week	8 weeks	= \$48,000	\$48,000	\$0
Silviculture admin – oversight, layout	\$320 per day	30 days	= \$9,600	\$0	\$9,600
Aspen Monitoring Plots			= \$600	\$0	\$600
Total			\$98,200	\$48,000	\$50,200

*Cost for initial entry broadcast burning in an area that has not had fire for over 100 years and therefore has heavy fuel accumulations.

LIST COOPERATORS AND DESCRIBE POTENTIAL PARTICIPATION:

This project is supported by numerous agencies and organizations, including Arizona Game and Fish Department, Greater Flagstaff Forests Partnership, The Nature Conservancy, US Fish and Wildlife Service, Ecological Restoration Institute, and the Ponderosa Fire Advisory Council. Aspen restoration within the Hart Prairie Project area has been coordinated with AZGFD and several wildlife organizations. On June 30, 2010, a field trip to various aspen sites within the project area was conducted with AZGFD, the Arizona Elk Society, Arizona Wildlife Federation, and the Coconino Sportsman. A field visit has also been conducted with the Nature Conservancy, Hart Prairie Preserve to aspen restoration sites located near the Preserve. The Forest Service is meeting with a representative from Hart Prairie Preserve to identify potential areas for treatment adjacent to the Preserve and the Bismarck Lake Aspen Restoration Project area. Potential participation by Hart Prairie Preserve includes thinning of conifers between private property and the Bismarck Lake Aspen Restoration Project area and other aspen stands located adjacent to the project area.

For FY 11 aspen restoration, Coconino Rural Environment Corp (CREC) will be utilized for conifer thinning/jackstrawing. The Coconino National Forest, Peaks Ranger District fuels crews will conduct the broadcast burning prior to tree felling. The Coconino National Forest Wildlife Crew will establish the permanent monitoring plots within the treatment area.

PROJECT MONITORING PLAN:

The greater Hart Prairie Project area will utilize an adaptive management approach by monitoring the effectiveness of different treatments in meeting project goals. The monitoring protocol for this project was developed in collaboration with the Arizona Game and Fish Department and Northern Arizona University. Results of these monitoring efforts will inform land managers regarding which treatments are most effective and will influence decisions as the Forest Service moves forward through project implementation.

Permanent monitoring plots will be established prior to treatment to determine the effectiveness of treatments by measuring the amount of regeneration, their survival after 5 years, and the effects of browsing on treatment effectiveness. Data will be collected pre- and post-treatment, then once every year for 5 years. Data will be

(revised 7-02-2007)

collected on all trees greater than 6 inches in height. Tree data will be collected using a 1/20th acre fixed area plot for trees greater than 5 inches dbh. Tree data will be collected using a 1/100th acre fixed area plot for trees less than 5 inches dbh. Tree data collected will include species, dbh, height, crown base height, crown ratio, and damage. Two photos will be taken from the plot center, one north and one south. Vegetation data will also be collected on three different species (nodding brome, vetch, and red and yellow pea) using a 50 ft transect to assess height and percent browsed.

PROJECT MAINTENANCE: Coconino National Forest

PROJECT COMPLETION REPORT TO BE FILED BY: Patty Ringle

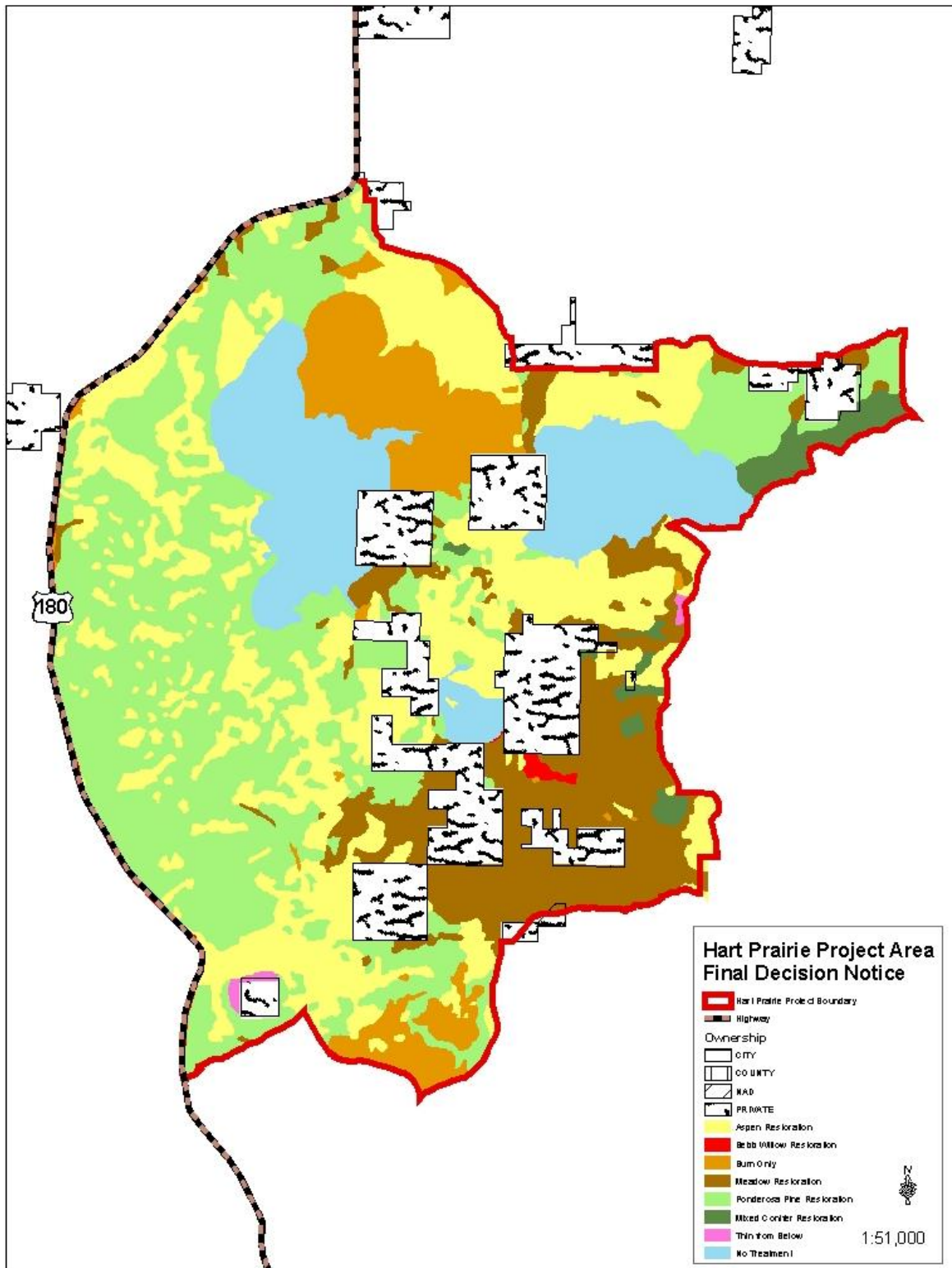


Figure 1. Hart Prairie Project Final Decision Notice Treatments, Coconino National Forest, Arizona.

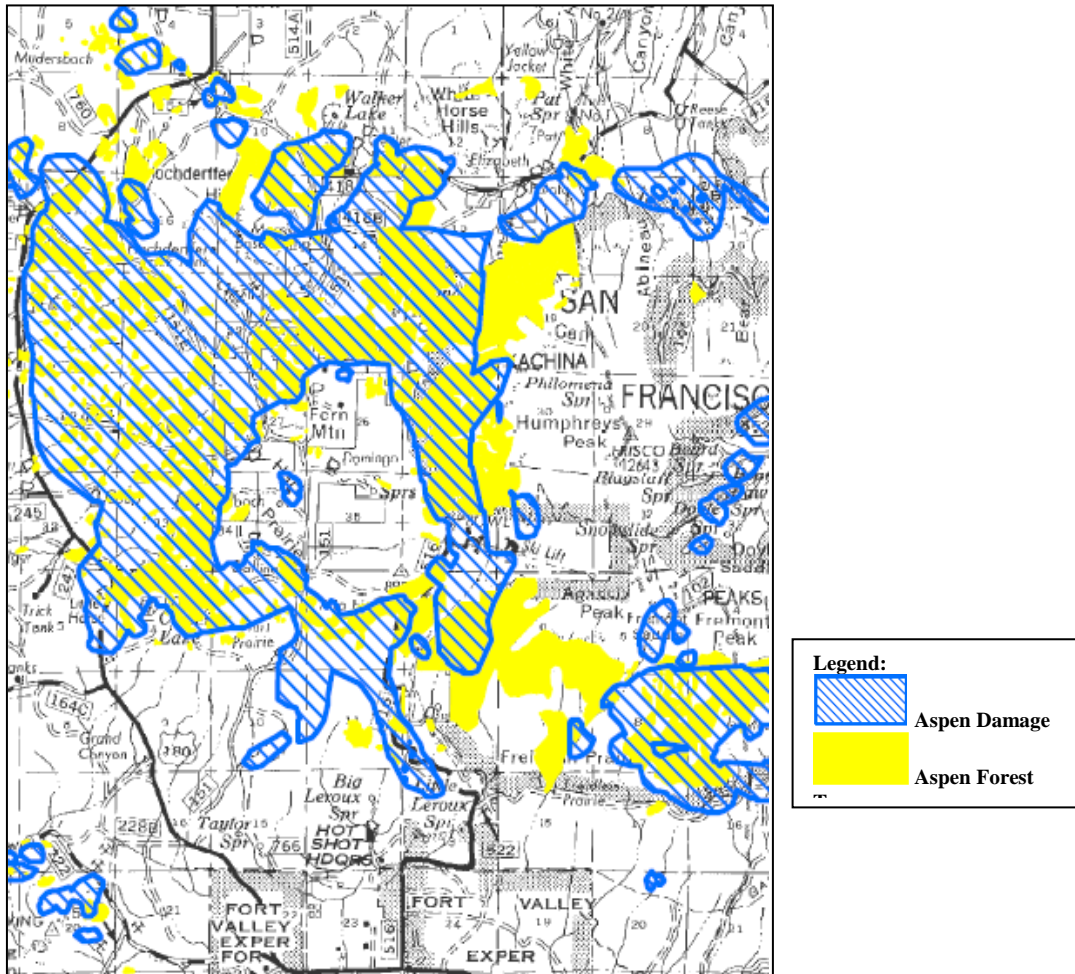


Figure 2. Aspen Decline in the Hart Prairie Project area, San Francisco Peaks, 1999-2007.

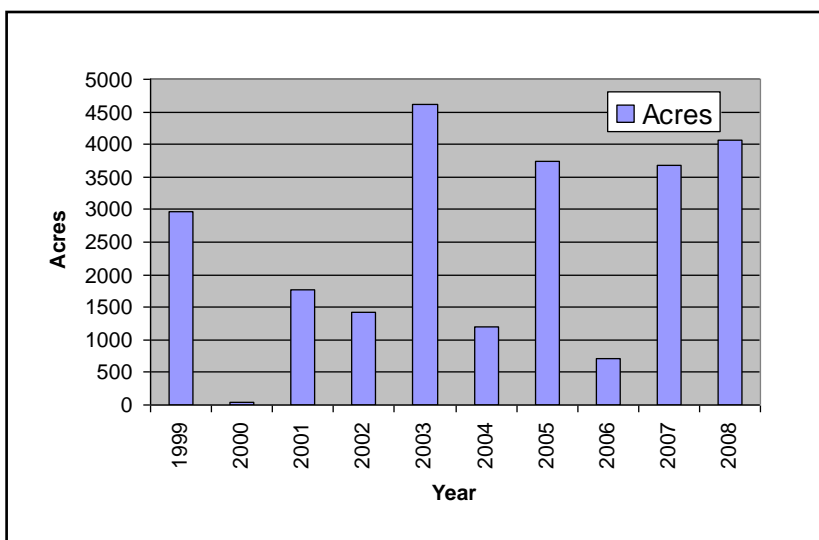


Figure 3. Acres of aspen impacted in the Hart Prairie Project Area, 1999-2008, by several different stressors including: late season frost (1999); severe drought (2002-2003); insect defoliation (2004, 2005, and 2007).



Figure 4. The white bark of dead aspen in the Hart Prairie Project area are readily apparent in this aerial photo taken in July, 2008.

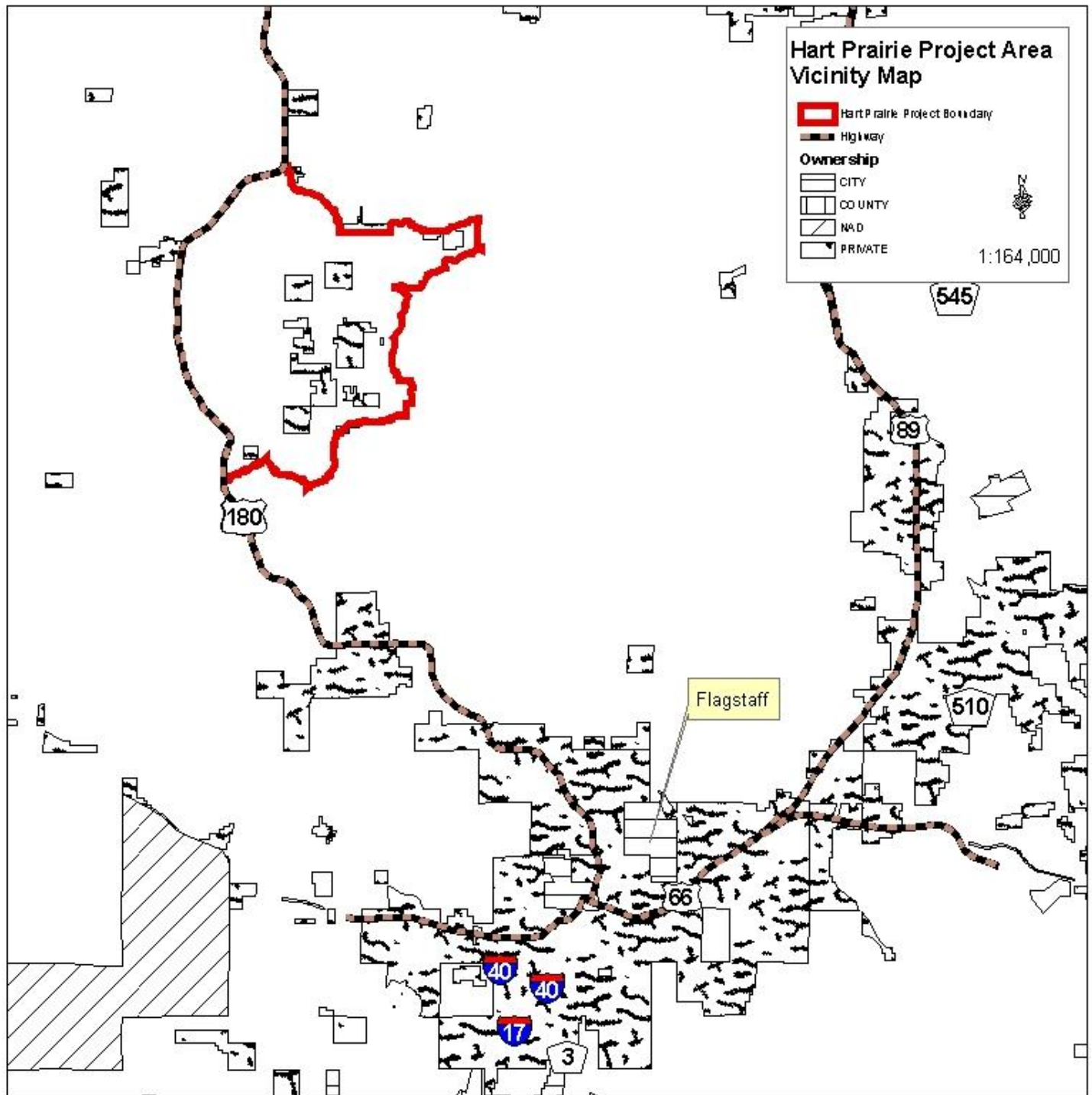


Figure 5. Hart Prairie Project vicinity map.

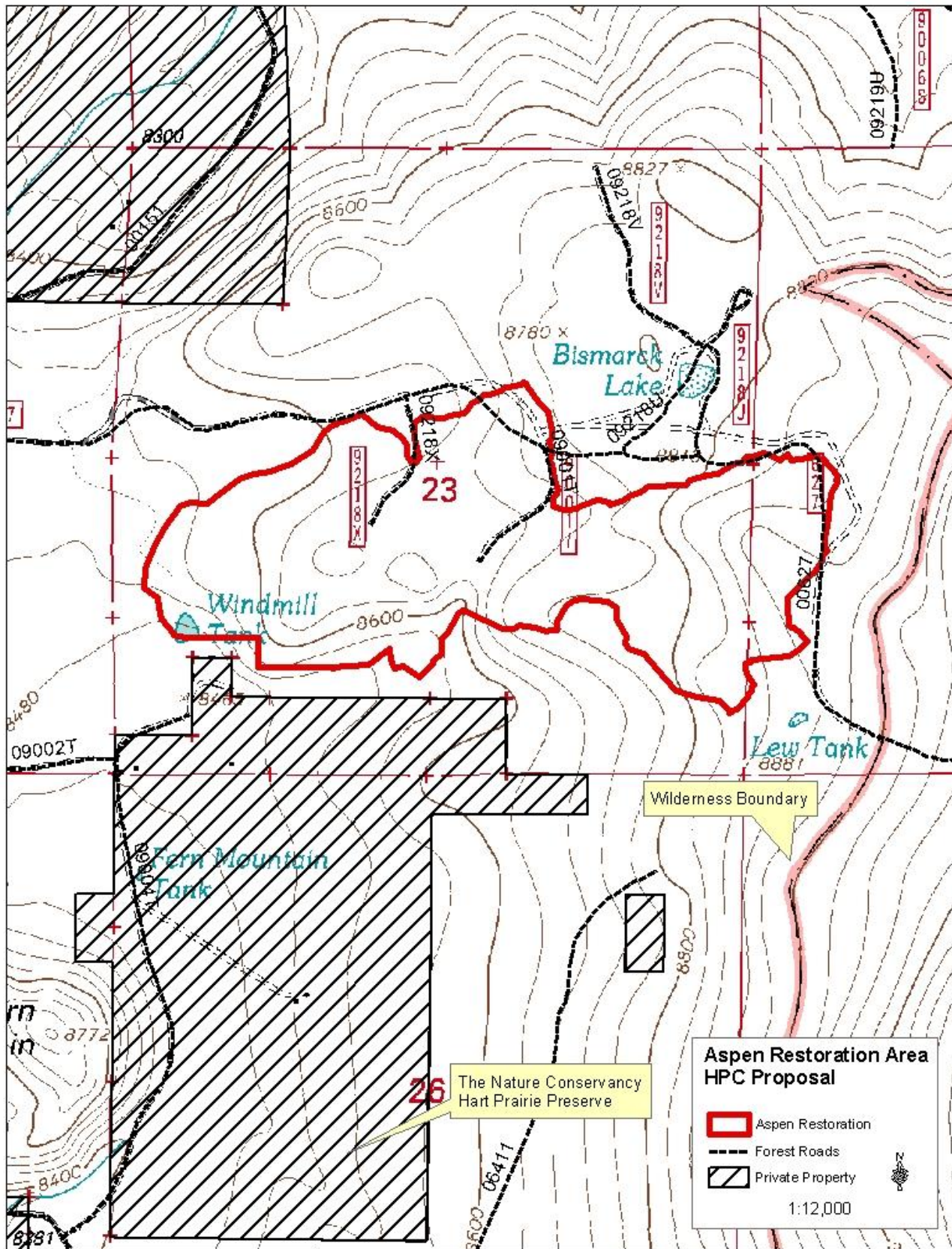


Figure 6. Bismarck Lake Aspen Restoration Project area located within the greater Hart Prairie Project area, Coconino National Forest, Arizona.